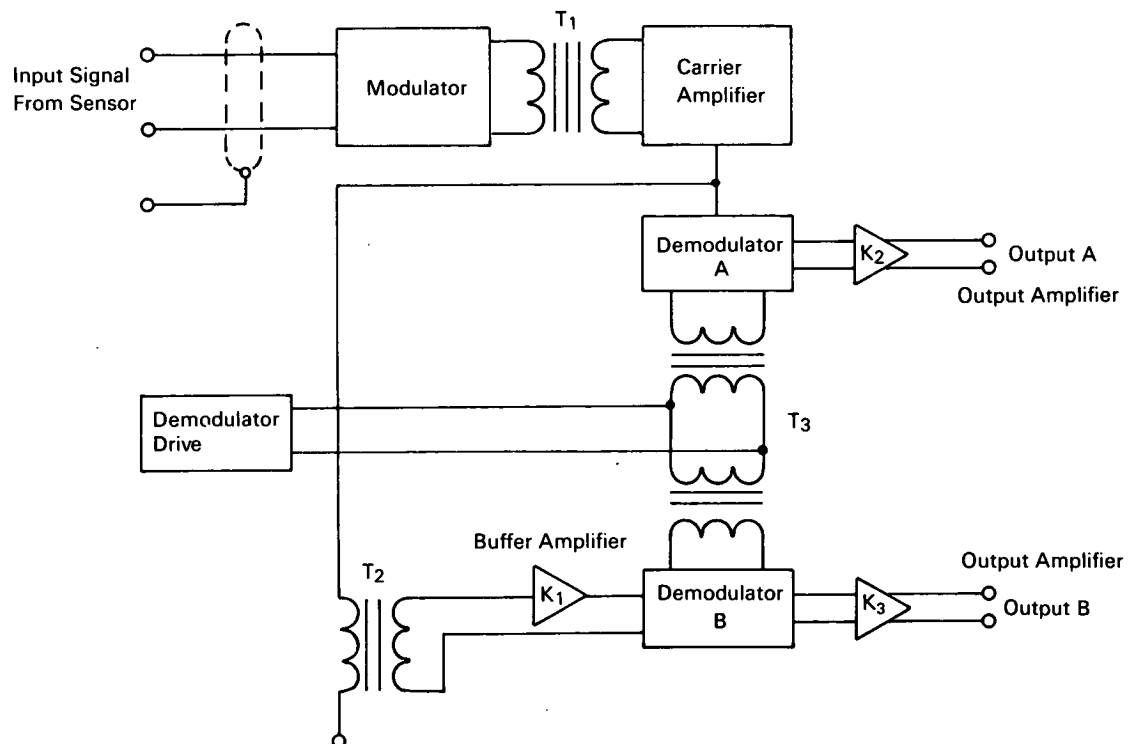


AEC-NASA TECH BRIEF



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Amplifier Provides Dual Outputs from a Single Source with Complete Isolation



The problem:

To provide a means of obtaining two amplified outputs from a single input signal. Complete isolation from input to output is required. Also, since large differences in ground potentials may exist between the outputs, these stages must be isolated from one another. Dual outputs from one input signal have been used before. Previous

designs, however, utilized one and sometimes both outputs in common which would not permit grounding of the two outputs at different potentials.

The solution:

An amplifier which provides transformer isolation and which uses modulation techniques to obtain separated outputs.

(continued overleaf)

How it's done:

A low-level signal from a basic sensor such as a thermocouple or strain gage is fed into differential input terminals of the amplifier through a twin conductor, shielded cable. The signal is immediately modulated to achieve an equivalent dc signal which is then coupled into a carrier amplifier via isolation transformer T₁. After amplification to the desired level, the signal from the carrier amplifier is fed into output demodulator A for conversion back to an amplified duplication of the original signal. The carrier amplifier signal is also fed into demodulator B. In this path, however, transformer T₂ and buffer amplifier A₁ are added ahead of the demodulator. Transformer T₂ provides carrier signal isolation and buffer amplifier K₁ provides impedance isolation to prevent demodulator B from introducing spikes back into transformer T₂.

Both demodulator A and demodulator B are simultaneously driven through separate isolated windings of transformer T₃. Output amplifiers K₂ and K₃ are included to provide low output impedance characteristics and load driving capability. No conductive paths exist between the input terminals and output A, between the input terminals and output B, or between output A and output B. The level of ground voltages is limited

only by the breakdown voltages of the transformers, which can be controlled at the time of transformer production.

Notes:

1. In typical use, one output is employed as a control signal, while the second provides signal monitoring. Adaptations of this method for achieving dual isolated outputs may be used in devices other than amplifiers.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
AEC-NASA Space Nuclear Propulsion
Office
U.S. Atomic Energy Commission
Washington, D.C. 20545
Reference: B67-10221

Patent status:

No patent action is contemplated by AEC or NASA.

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